

# AEROSPACE MEDICINE - SPECIALISTS -

Relevant and Ready to Army Space Operations

BY COL JOHN P. ALBANO, ARMY ASSOCIATE DIRECTOR,  
USN AEROSPACE MEDICINE RESIDENCY PROGRAM



Recently, the Army Space Cadre Mobile Training Team from U.S. Army Space and Missile Defense Command/Army Forces Strategic Command's Future Warfare Center Directorate of Combat Development (FWC DCD) traveled to Pensacola, Fla., to train Army and Navy residents in aerospace medicine the fundamentals of Army Space Operations. The FWC DCD Trainers conducted the 40-hour Army Space Cadre Basic Course. The intent was not to give an orientation to Space capabilities for medical applications, but to indoctrinate highly trained and motivated medical professionals into the military Space culture. Building on this foundation, they could apply medicine within that cultural framework. Unlike traditional clinical medicine, which focuses on the care and treatment of patients with disease and injury, aerospace medicine is occupationally focused and preventive in application. Health maintenance with minimal therapeutic intervention becomes the *sine qua non*. In the context of air and space, it is concerned with normal (i.e. healthy) physiology in an abnormal environment.

Since the early days of powered aeronautics, the flight surgeon was involved with assessing human factors in the military application of aircraft. While demonstrating the capabilities of the Wright Flying Machine, Lieutenant Thomas Selfridge crashed and suffered massive and fatal head trauma. The flight surgeon, on the accident investigation board, recommended that head protection be developed and worn by all aviators. Later, high aircraft accident rates due to pre-existing medical conditions

dictated medical standards. Rapidly expanding technology increased the speed, altitude, performance, and complexity of the aircraft. Research into human protection and performance ensued. Flight surgeons were undeniably integral to the aviation culture.

## Space: Manned and Unmanned

In much the same way, flight surgeons were historically associated with the space culture...manned space flight. Space Cadre introductory courses chronicle the space age, including the "race to the moon." As engineers worked the development of lift and application of orbital physics, flight surgeons aided other engineers with protecting the astronaut, allowing him to perform critical tasks. Both engineers and flight surgeons required in depth knowledge of the hazards in the space environment and were concerned with the effect of that environment on their respective systems (the vehicle and the human).

Flight surgeons were also involved in astronaut training on earth and monitoring astronaut health while in space. Most importantly, flight surgeons were responsible for determining astronaut fitness for space duty. Their overall mission was to maintain the astronaut's health and "keep him in the game." Normally, the flight surgeon's involvement was transparent and his measure of success was the astronaut boarding the space vehicle. At times, the flight surgeon "grounded" the astronaut, whose medical condition put the astronaut or the mission at risk. A classic example is when Ken Mattingly, of Apollo 13, was grounded for measles exposure, two days before launch.

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Publicly, considerable emphasis has been placed on the manned space missions. July 2009 marked the 40th Anniversary of man's landing and walking on the moon. October 2008 celebrated NASA's 50th Anniversary as a government organization dedicated to space exploration. Local book stores filled the shelves with texts that recounted NASA's crowning achievements in both engineering and health sciences.

Not well known was that two years after NASA's establishment, the entire Army Ballistic Missile Agency was transferred to NASA to become the nucleus of the agency's space program. Although always integral to human space exploration, Army space went from an organization focused on developing an effective counter to missiles, to the current organization as the Army Service Component Command to U.S. Strategic Command focused on exploring and exploiting the opportunities of space and meeting the challenges of missile defense. (General Order 37 redesignated USASMDC/ARSTRAT as an Army Service Component Command vice Major Command). This organizational evolution was the direct result of the Army and Joint warfighter's increasing reliance on space and was reflected in the Commission to Assess U.S. National Security Space Management and Organization, DoD 5101.2 Executive Agent for Space, and Presidential Directive 49. What role, then, does the flight surgeon have in such a military organization?

## Flight Surgeons and Aerospace Medicine Specialists (aka Residents in Aerospace Medicine)

There are two types of flight surgeons, the basic level flight surgeon and the aerospace medicine specialist. The difference between the two is akin to the Space Enabler and Space Professional. Very often, the term RAM (resident in aerospace medicine) is synonymous with aerospace medicine specialist because residency is the path to become a specialist and "RAM" is easier to remember and articulate. For the young Army physician, who has completed a hospital-based internship, training in aerospace medicine starts with the Army Flight Surgeon Primary Course conducted at United States Army School of Aviation Medicine. This service specific six-week course culminates in the designation as an Army Flight Surgeon and the award of the Army Flight Surgeon badge. The course prepares graduates for duty as an Aviation Battalion Surgeon and covers basic concepts in aerospace physiology, aeromedical evacuation, mishap prevention and investigation, aeromedical policy and administration, and brigade medical planning and support.

The next higher level of medical training is at an Accreditation Council for Graduate Medical Education approved residency program in Aerospace Medicine. Aerospace Medicine was recognized as a medical specialty in 1953, four years before Sputnik! An interesting side note is that Aerospace Medicine was recognized as a specialty two and a half years before Occupational Medicine, a companion Preventive Medicine field.

### The Aerospace Medicine Residency training is three years long and the core competencies are :

- Manage health status of individuals working in all aspects of aerospace environment
- Apply and develop physical standards for aerospace duty
- Promote aerospace passenger health, safety, and comfort
- Facilitate optimum care of patients transported in the aerospace environment
- Apply human factors/ergonomic concepts to the aerospace environment
- Promote aerospace operational safety and mishap prevention
- Interpret, integrate, and/or perform aerospace medical research

### Training includes :

- Pre-requisite Masters of Public Health degree
- Piloting fixed and rotary wing aircraft
- Aviation Safety
- Accident investigation
- Strategic and tactical air medical evacuation
- Disaster Medicine
- Civil Aviation Medicine
- Space Medicine
- Hyperbaric Medicine
- Physical examinations and qualifications
- Clinical aerospace medicine
- Travel or global medicine
- Aerospace Medical Research
- Presentation at the Aerospace Medical Association Annual Scientific Meeting

Missing from the list (until just recently) was Space Operations. The resultant knowledge and skills make the aerospace medicine specialist operationally oriented and preventive in nature. The practice of aerospace medicine is multidisciplinary, extending into the fields of basic science; physics, chemistry, mathematics; and the engineering disciplines: aeronautics, mechanical, electrical. The scope of practice ranges from routine sick call, to deployment medical readiness, to fitness determinations, to medical policy promulgation, to scholarly activity, and to research, development and acquisition.

At the end of the day, an aerospace medicine physician is a board certified specialist and serves as a subject matter expert who applies medical principles in extreme environments, such as air and space (mountain and undersea to name a couple more). In the medical community, he is a professional just as the FA40 is a professional in the space community. Recognizing the RAMs medical professional status, the Army Space Professional Development Office considered the aerospace medicine specialist a Space Enabler (3Y) in the Space Cadre Community.

## Space Missions Flight Surgeons and RAMs Already Support

Army flight surgeons and RAMs already support, directly or indirectly, the space mission through efforts such as routine aviation medicine sick call at the Kwajalein Atoll Reagan Test Center, emergency medical response for Shuttle launch and recovery operations (Department of Defense Manned Spaceflight office), medical standards for UAV operators (who use space systems to conduct their mission), and human performance research in extreme environments (such as high altitude operations) or pushing the physiologic envelope to gain a combat edge.

Army flight surgeons are integral to aviation units that support the Intelligence community, who also rely on space systems. Because of their disaster medicine training, RAMs are used as Joint Task Force Surgeons for Defense Support of Civil Authorities, in support of U.S. Northern Command's mission. The Command is heavily reliant on Space for situational awareness as well as command, control and communications.

## Space Cadre: A Tale of Two Communities

USASMDC/ARSTRAT's lineage and organizational structure reflect the evolution of the Army's response to the growing missile threat, as well as the Army and Joint warfighter's increasing reliance on space. Because of the Commission to Assess U.S. National Security Space Management and Organization, Department of Defense 1501.2 Executive Agent for Space, and Presidential Directive 49, the services were to grow and maintain a cadre of space-smart people.

While SMDC/ARSTRAT was building their Space Cadre, the Army aerospace medical community was defining and refining career tracks for its cadre, with the goal of retaining and utilizing senior aerospace medicine specialists. The Army aerospace medicine specialist community has longed to associate with the Army Space community, but it wasn't until the Space Cadre Data Call for 3Y Space Enablers that the opportunity presented. Three things made it happen. 1) Identification of aerospace medicine specialist (vs basic level flight surgeons) as USASMDC 3Y ASI. 2) Award of the designation to the entire Army Aerospace Medicine Specialist community. 3) USASMDC/ARSTRAT's official recognition of four Accreditation Council for Graduate Medical Education aerospace medicine residencies as the medical equivalent of Space training, producing 3Y Additional Skill Identifier level knowledge.

Reviewing the curriculum in depth, however, Army Space Professional Development Office did not consider it as "space

operations" training. The purpose of space operations training is to indoctrinate the service member into the space operator's culture (akin to the primary flight training indoctrinates the flight surgeon student into the aviation environment and culture). In keeping with the Space Cadre professional development intent, Army Space Professional Development Office requested FWC DCD coordinate with the Naval Aerospace Medical Institute for the Army Space Cadre Basic Course. FWC DCD and the Naval Aerospace Medical Institute met in early November 2009 and coordinated the course to be taught at the Institute Jan. 25-29, 2010. As a result, FWC DCD will provide continued Space Cadre MTTs as a regular and routine part of the Navy Aerospace Medicine Residency Training Program.

## Connecting the Dots

Having an appreciation for the flight surgeon's history in aeronautics and astronautics and given USASMDC's 3Y Additional Skill Identifier award and Space Cadre basic training to the RAMs, the question still remains. What role, then, does the RAM have in the USASMDC/ARSTRAT?

In its early history, USASMDC/ARSTRAT was a small organization, element, center, or institute that was systems-based and didn't need endogenous medical support. That support usually came from a medical treatment facility that had an "area medical support mission," within which the pre-USASMDC organization fell. Since the 1985 Army Space Initiative Study, Army Space has matured into the organization it currently is. This organization has operational, research, and combat development all within its sphere of direct influence.

Operationally, the standing up of the 1st Space Brigade dictated Combat Service Support requirements. Medical Command doctrine is that organizations from battalion through corps are authorized a surgeon. The surgeon is responsible for coordinating health assets and operations within the command. Although based out of Colorado Springs, Colo., the unit is fractionated and deployed as teams. Command, control and communications for health implementation become a challenge.

From the research perspective, USASMDC Research, Development and Acquisition has medical concerns related to health hazards exposure to the development and employment of space systems. In developing space systems, USASMDC RDA must consider manpower and personal integration issues. Manpower and personal integration mission is to optimize total system performance, reduce life cycle costs and minimize risk of soldier loss or injury by ensuring a systematic consideration of the impact of materiel design on soldiers throughout the system development process.

Aerospace medicine specialists, who track through U.S. Army Aeromedical Research Laboratory, are uniquely trained

in the Research, Development and Acquisition culture, specifically military operational medicine. Military operational medicine research and development is focused on human performance and protection, some of which are collaborations with NASA. It is the aerospace medicine specialist's experience with the RDA life cycle management and milestone principles that allow him to be the human advocate regarding the health hazard analysis part of Manpower and Personnel Integration issues affecting space systems development and employment.

To date, there is no medical corps officer in the entire command to address the broad scope of medically related issues. Recognizing the requirement, USASMDC G1 sent a representative to the October 2009 Medical Command Grade Allocation Conference to present its case and to request priority in filling the requirement. Although the last presenter of the day, USASMDC G1 captivated the board and won resounding support. As a result, USASMDC/ARSTRAT is currently scrubbing its Table of Distribution and Allowances for a command surgeon billet for a 2012 fill.

## Conclusion

That command surgeon must have a broad skill set and experience which should include knowledge of the space environment. USASMDC/ARSTRAT would benefit by having a command surgeon, who is operationally indoctrinated and attuned to RDA principles. The aerospace medicine specialist, then, is uniquely poised to fill the position and address all the medical requirements appropriate for a command with operational troops and an RDA function.

To be sure, only a few aerospace medicine specialists would track through a Space Cadre Career. Receiving aerospace medicine and space operations training, as well as 3Y Additional Skill Identifier award, early in the RAM's career enables the select few to fill a handful of medically related 3Y coded billets, of which the duties progress to higher responsibility. An example of an aerospace medicine specialist Space Cadre Career may look like: RAM/Aviation Brigade Surgeon (not 3Y unless 1st Space Brigade becomes a requirement)/U.S. Army Aeromedical Research Laboratory Branch Chief/ NASA Liaison Officer/U.S. Army Aeromedical Research Laboratory Division Director/USASMDC command surgeon.

In this way, USASMDC would not only get a surgeon with a wide scope of knowledge, skills, and experience, it would also be getting a surgeon who is a career Space Enabler. Hence, the aerospace medicine specialist is, indeed, an active and contributing member of the Space Cadre. The aerospace medicine specialist would be a force multiplier and enable USASMDC/ARSTRAT to more efficiently and effectively accomplish its global mission. 



## BIO

### COL John P. Albano

John is a Space Cadre member, an Army flight surgeon, and a Board Certified Aerospace Medicine Specialist. He has a Medical Doctorate from the University Of South Dakota School Of Medicine, a Masters in Public Health from the University Of Texas School Of Public Health at San Antonio, and Aerospace Medicine Residency Training at Brooks Air Force Base. Albano has over 22 years of combined clinical, research, and academic experience in U.S. Army aerospace medicine.

His clinical experience includes general medical practice, air medical evacuation of critical patients, occupational medicine in the aviation environment, aeromedical fitness determinations, and helicopter accident investigations. His research management experience includes air crew protection, aeromedical device testing, Army systems health hazard analyses, aeromedical policy promulgation, and advanced technology applications in medicine. Following his medical staff duty as the Regional Aviation Medicine Consultant in the Republic of Korea, he was the Chief of the Aeromedical Education Branch of the U.S. Army School of Aviation Medicine at Fort Rucker, Ala. Currently, he is the Army Associate Director for the Navy Aerospace Medicine Residency at Pensacola, Fla. Albano is responsible to train Army RAMs for operational duties primarily as command surgeons to aviation units starting at battalion as well as the Army School of Aviation Medicine, Army Aeromedical Research Laboratory, Army Aeromedical Activity, Army Safety Center, and Lyster Army Troop Health Clinic.